RUST GEOTECH INC.

Spectral Gamma-Ray Borehole
Log Data Report

Borehole 51-09-04

Log Event A

Borehole Information

Farm : TX	**Tank :** TX-109	**Site Number :** 299-W15-188
N-Coord : 41,830	**W-Coord :** 75,714	**TOC Elevation :** 670.00
Water Level, ft : 98.00	**Date Drilled :** 4/30/1976	

Casing Record

Type : Steel-welded	Thickness : 0.280	ID, in. : 6
Top Depth, ft. : 0	Bottom Depth, ft. : 105	

Borehole Notes:
According to the driller's records, this borehole was grouted but not perforated. An 8-in. starter casing was installed to a depth of 20 ft, and 10 ft of the casing was then removed. The borehole was drilled to a depth of 105 ft and finished with a 6-in. casing to 100 ft. Forty gal of grout was added between the 8-in. and 6-in. casings. Fourteen gal of grout was added to the bottom of the borehole.

The top of the borehole (the zero reference for the SGLS) is approximately 2 ft above the tank farm grade.

The casing thickness is presumed to be 0.280 in., on the basis of published thickness for schedule-40, 6-in. steel tubing.

Equipment Information

Logging System : 2	**Detector Type :** HPGe	**Detector Efficiency:** 35.0 %
Calibration Date : 11/1995	**Calibration Reference :** GJPO-HAN-3	**Logging Procedure :** P-GJPO-1783

Log Run Information

Log Run Number : 1	**Log Run Date :** 3/28/1996	**Logging Engineer:** Kim Benham
Start Depth, ft.: 98.5	**Counting Time, sec.:** 100	**L/R :** L **Shield :** N
Finish Depth, ft. : 0.0	**MSA Interval, ft. :** 0.5	**Log Speed, ft/min.:** n/a

Log Run Number : 2	**Log Run Date :** 3/29/1996	**Logging Engineer:** Kim Benham
Start Depth, ft.: 0.0	**Counting Time, sec.:** 100	**L/R :** L **Shield :** N
Finish Depth, ft. : 16.0	**MSA Interval, ft. :** 0.5	**Log Speed, ft/min.:** n/a

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Analysis Information

Analyst : S.D. Barry

Data Processing Reference : P-GJPO-1787 Analysis Date : 11/21/1996

Analysis Notes :

This borehole was logged in one log run with a repeat of one section of the borehole. The pre- and post-survey field verification spectra met the acceptance criteria established for the peak shape and detector efficiency, confirming that the SGLS was operating within specifications. The energy calibration and peak-shape calibration from these spectra were used to establish the channel-to-energy parameters used in processing the spectra acquired during the logging operation.

Casing correction factors for a 0.280-in.-thick steel casing were applied during analysis.

The only man-made radionuclide detected in this borehole was Cs-137. The presence of Cs-137 contamination was measured almost continuously from the ground surface to about 18 ft, from 23 to 27.5 ft, and intermittently to the bottom of the borehole. The maximum Cs-137 concentration was detected at 25.5 ft and is about 71 pCi/g.

The K-40 and Th-232 plots show an increase in concentration values beginning at about 22 ft. The K-40 concentrations show another increase beginning at about 51 ft. Between 61 and 80 ft there is a region of elevated K-40 concentrations. As a quality assurance measure, a rerun was conducted from 0 to 16 ft and the results from the Cs-137, K-40, U-238, and Th-232 were plotted. The calculated concentrations were well within the statistical error and show an excellent repeatability of the system.

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Report for tank TX-109.

Log Plot Notes:

Separate log plots show the man-made (Cs-137) and the naturally occurring radionuclides (KUT). The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.

Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A rerun plot was generated for the region between 0 and 16 ft. The radionuclide concentrations shown were calculated using the separate data sets provided by the original and rerun logging runs.

A time-sequence plot of the historical gross gamma log data from 1976 to 1993 was created and is provided with the suite of SGLS logs for this borehole.